Light-By-Light Scattering Once More

Sylwester Kornowski

Abstract: On August 23, 2017, using the Scale-Symmetric Theory (SST), I showed that the central value for the cross section for light-by-light scattering should be 76.5 nb. At that time, the LHC result was 70 nb. But now (2019) it is 78 nb i.e. much closer to the SST value and in bigger distance from the Standard-Model (SM) predicted central values i.e. 45 and 49 nb. Notice that the SM result 45 +- 9 nb is outside the current experimental result measured with high accuracy (the 8.2 sigma).

In 2017, the LHC measured fiducial cross section for light-by-light scattering was [1]:

$$\sigma_{fiducial,2017} = 70 \pm 24 \text{ (stat.)} \pm 17 \text{ (syst.) nb} . \quad (1)$$

Now (2019), the LHC measured fiducial cross section for light-by-light scattering with high accuracy (8.2 σ) is [2]:

$$\sigma_{fiducial,2019} = 78 \pm 13 \text{ (stat.)} \pm 7 \text{ (syst.)} \pm 3 \text{ (lumi.) nb} . \quad (2)$$

My central value predicted in 2017 was 76.5 nb [3]. It is very close to the current experimental result which is in big distance from the SM predicted values 45 ± 9 nb [4] and 49 ± 10 nb [5]. Notice that the SM result 45 ± 9 nb is outside the current experimental result (see formula (2)).

We can say that my predicted theoretical result gives credibility to the Scale-Symmetric Theory.

We see that the Standard Model is an incomplete theory.

References

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